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METAL-WORK AMONG THE HINDOOS.

By DR. ALEXANDER HUNTER.

THE arts of working in gold, silver, copper, bronze, brass, bidryware, kooftgaree, enamel, bell-metal, zinc, steel, and iron, have long been practised in India; and in some districts of the country, where these Art-manufactures have been encouraged, they are brought to great perfection; while in others we find them still in their primitive and almost rude simplicity, but characterised by local peculiarities and tastes, which give to some of them an artistic value somewhat akin to the bronze and metal works of Japan and China; though they far surpass most of the manufactures of these countries, and evince a thorough acquaintance with both the theory and practice of geometry, the principles and application of design, the selection and arrangement of patterns particularly adapted for filling spaces, as well as those suited for peculiar works in metal. In addition to these important qualities, the productions in mixed metals in India evince a taste in the harmony of colours, and a knowledge of the chemistry of metals, and salts of metals, that surprise European manufacturers; and prove that different races, though apparently behind in what is called the onward march of European civilisation, have still attained to various degrees of excellence, more especially to a freedom of drawing and to manipulative dexterity which have escaped detection or appreciation amongst refined or highly civilised nations. As several of the processes of manufacture are peculiar to India, and the principles of the chemistry of metals are thoroughly well understood nearly all over India, it may not be out of place to call the attention of our manufacturers to one or two points to which great importance is attached by the Hindoos. The first of these is a knowledge of free, bold, linear drawing, and the early acquisition of the power to draw clear outlines. This art is taught in most parts of southern India by the females, who commence teaching their children to draw either on sand or on a mud floor, which is washed daily; when the children are older they draw on a black wooden board, the colour of which is renovated in a cheap way about once a fortnight, with lamp black and the mucilaginous juice of the fruit of the briony, *Coccinea Indica*, or *Covei codei* (Tam.), or the juice of the flowers of the shoe-plant, *Hibiscus sabdariffa*. It may not be generally known that this flower, if rubbed upon white paper, produces a most useful substitute for litmus paper, a very delicate test for acidity in solutions, and that the flowers of several species of *Hibiscus* give a good shining polish to boots or shoes; hence the common name of shoe-plant. Several coloured flowers are employed in the same way to produce chemical test-papers, or tinted surfaces for ornamentation. The fresh flower is rubbed on white paper till the juice exudes, and thus in a few minutes a most delicate test-paper is produced, or a tinted surface of varied gradations can be made, and by combining different flowers mixed tints are the result. In this simple way a considerable knowledge of the chemistry of flowers, leaves, and fruits of plants, has been acquired; and we shall have occasion to refer hereafter to the chemical uses of several plants in some of these descriptions of manufactures in metals. Another important branch of education which is entrusted to the females of southern India are the rudiments of arithmetic and practical geometry, with the principles of colour, derived from flowers, coloured earths, and cheap substances, that can be applied to floor or wall decoration. Although these do not come under our consideration at present, I must make a slight allusion to them, as the patterns from which the forms of some of the most elegant manufactures in metals are taken can generally be traced to flowers, fruits, or seeds; and the punches, or steel-tools, used in their ornamentation are almost invariably suggested by some parts of the same plant or flower which suggests the design.

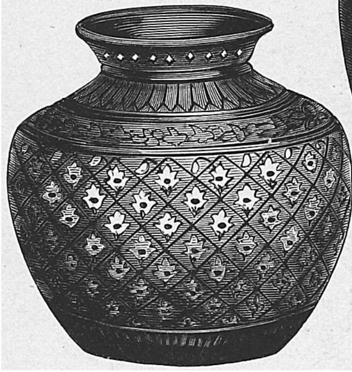
Fig. 1.

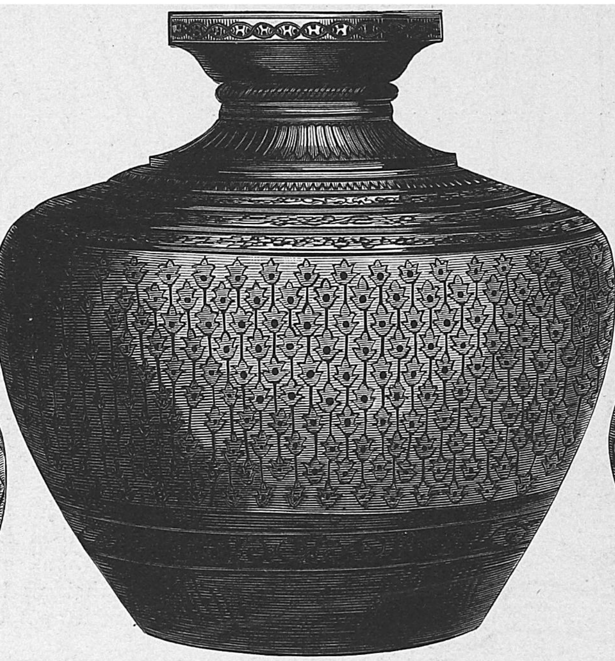
Fig. 2.

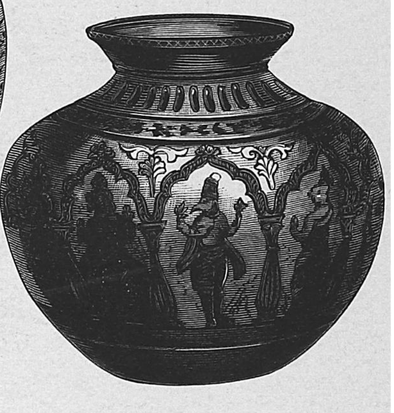
Fig. 3.

It is not known with any certainty when works in the precious metals were first manufactured in India. Some of the ornaments in gold and silver which have been found in old tombs, accompanied by beads, necklaces of cut cornelian, agate, rock crystal, and felspar, have been enclosed in cinerary urns with calcined bones and teeth; these are believed to be upwards of two thousand years old; but there are others dating a few centuries after the Christian era which bear a striking similarity to the Etruscan and Grecian periods of Art, and are accompanied by manufactures in bronze and pottery very like those discovered in Herculaneum, Pompeii, and Etruria. During the early Buddhist periods, or from 2400 years down to the third century of the

Christian era, it is supposed that the arts of Greece and Rome found their way to India; and at a subsequent period the son of one of the Roman emperors, who was banished for his licentious profligacy, visited Cambodia, and took with him skilled carvers, sculptors, and workers in precious metals. It is probable, however, that India could boast of efficient workmen of her own training even before these periods. Many of the oldest ornaments in gold found in the tombs, cairns, cromlechs, and kistvaens, evince a considerable amount of skill in manipulation and taste in design. The best of these were recently discovered in the Salem, Coimbatore, and Mysore territories, and on the Neilgherries.

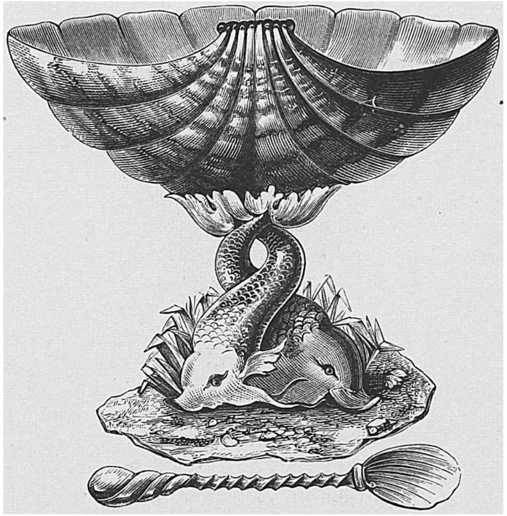

Fig. 4.

One point that seems always to have been insisted upon by the gold and silversmiths in India, is the selection of pure, unalloyed metals. This seems to simplify and expedite the process of manufacture, and probably accounts for the delicacy of the workmanship, as pure metals are more ductile than alloys.

THE GOLD AND SILVER FILIGREE WORKS OF INDIA.

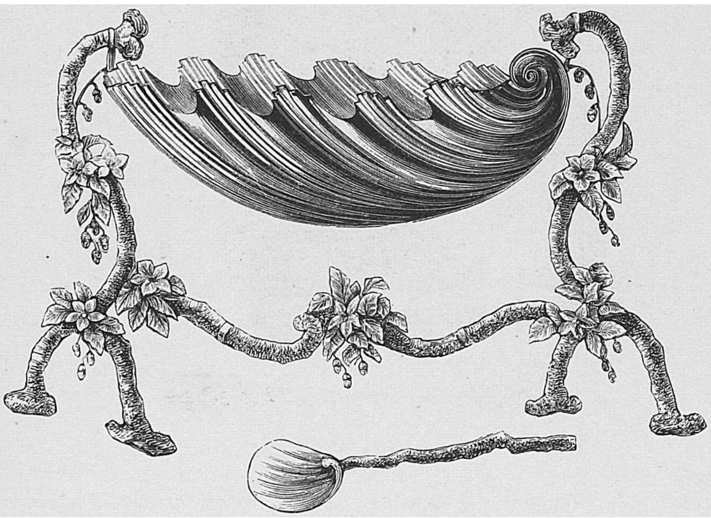

Fig. 5.

The finest gold filigree work of southern India is manufactured at Trichinopoly, and is remarkable for the delicacy and intricacy of its workmanship. There are four or five varieties of rose pattern, and three or four of snake-pattern chains; the latter are very delicate, fine in texture, singularly pliant, and remarkably good imitations of real snakes. The rose-patterns are more elaborate in appearance, though not actually so difficult to manufacture. The process appears very simple, and the tools employed consist of a few fine steel-hammers, fine pincers, a few blowpipes, two or three highly-polished steel anvils, a burnisher, steel-scraper, a pair of fine compasses, and delicate scales and weights. So particular are the workmen about the purity of the metals, that they refine their gold or silver five times, by melting under a strong blast heat, before commencing to work with it. They are also very particular about the surfaces of their hammer and anvil being very highly polished and burnished. The work is commenced by beating the metal into thin plates nearly uniform, cutting these into long strips, and drawing them into very fine wire, by passing through perforated steel-plates, with a pair of strong steel-pincers. The holes in these steel-plates are carefully punched of graduated sizes, and are drilled of a circular form; the plate is then tempered, or casehardened, and strongly hammered on both sides, till quite cold, the holes being frequently re-drilled and hammered. The plates are very strong and heavy, from six to eight inches long, two to three broad, and about two-thirds of an inch in thickness. They are firmly secured in a strong bench-vice, and the wire is drawn through them while the metal is kept heated by a blowpipe. After the wire is drawn, most of the dexterity of manipulation, and the beauty of the patterns, depend upon the practical skill of the artisans, who, for the most part, work from memory, and without any pattern before them, although most of the native jewellers have books containing a great variety of patterns; the beauty of these depends chiefly upon delicate workmanship, or on curious and original combinations. The localities where the best and most tasteful work is produced are Trichinopoly, Cuttack, Travancore, Vizianagram, and Delhi. This manufacture is very similar to the filigree-works of Malta, Genoa, Paris, Florence, and London; but it is finer in India, and cheaper. Some varieties, in which burnished, frosted, and chased metallic surfaces are combined with the filigree-work, bear a considerable resemblance to Scandinavian jewellery; but the latter is more tinselly in effect, and coarser than the best specimens from Cuttack and Trichinopoly. The Chinese and Japanese understand filigree manufacture, but their works are not so tasteful, nor do they appear to be so much appreciated, as those of India.

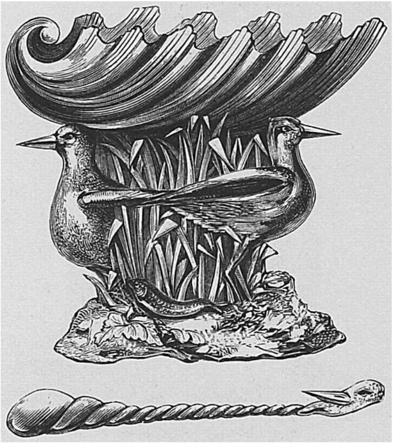

Fig. 6.

INLAID WORKS IN DIFFERENT METALS, AS BRASS, COPPER, BELL-METAL, AND SILVER.

In commencing the manufacture of these, sheets of brass or of pure copper are usually selected, and cut into pieces that will form the required shape by hammering. The metal is frequently heated to a dull red to prevent it from splitting; and if the form is complex, the vessel is made in several pieces, the edges of which are beat out thin, and the overlapping edges, after being thoroughly cleaned from oxide by scraping or by nitric acid, are heated and welded together with a hard solder of brass, to which a little borax and resin in fine powder are added. The form of the vessel is then refined by hammering, the inside being supported by a rounded metal-anvil, held in the left hand. In some cases the planishing steel-hammer and the rounded anvil fit upon each other accurately; at other times the object is finished and polished on the turning-lathe. The surface to be decorated is then slightly oxidised by being oiled, smoked, and heated; the pattern is drawn upon it with a sharp steel point, and finished with a graving-tool. Sometimes the pattern is very carefully drawn upon thin paper; this is pasted upon the polished metal, and the outline is made out with a succession of punched and dotted lines. When elaborate or complex patterns are required, punches are made of very fine steel to produce portions of these, as flowers, rosettes, or delicate curves. When patterns are to be produced by combinations of two metals, as brass upon copper, zinc upon brass, or silver upon copper, thin sheets of these metals are beaten out, and the patterns are stamped with punches. For this purpose very pure metal is generally employed, and the surfaces are kept clean and bright, while the part of the vessel to which it is to be applied is roughened, and then moistened with a solution of borax, and the two metals are united by heating and hammering. The vessel is then cleaned with the acid pulp of tamarind, and finally polished with whitening, or chalk and water. Brass-vessels are often cleaned with the pounded leaves of the tamarind or of the *Cicer arietinum*, Bengal gram, or chick-pea, beaten into a pulp. This yields an impure tartaric acid liquor, which produces various shades of colour, often of very pleasing tints, especially when applied to pure copper and gently heated. By adding a little cinnabar, or sulphuret of mercury, to this acid mixture, and then exposing the vessel to heat, after it has been coated with the mixture, an amalgam is formed which makes the silver and copper combine. The copper acquires a rich purple brown colour, and the silver gets dark on the surface; but by rubbing with chalk, or fine emery powder, the silver resumes its brightness. Vessels of great elegance and purity of form are thus manufactured at Tanjore and Trichinopoly, where this branch of industry has met with encouragement, and has probably been carried on for many centuries. Fine collections of these manufactures may be seen at the India House Museum.

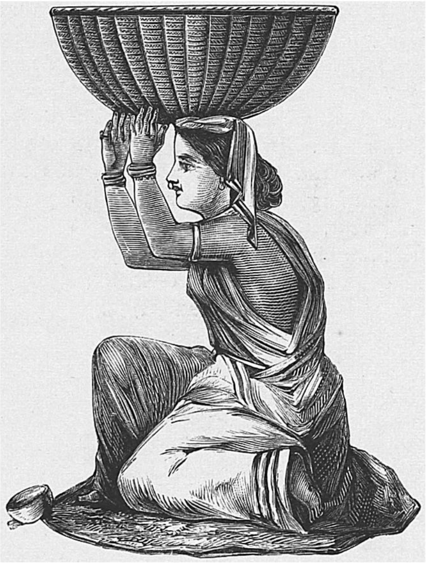

Fig. 7.

Chasing in Silver in the Madras School of Arts. First Attempts.

In the year 1850 experiments were made to introduce improvements in designs for silver saltcellars. Excursions were made to Ennore, Pulicat, and the Adyar, with the pupils, to collect shells, plants, and objects of natural history, which might suggest original or beautiful forms. On one excursion upwards of seventy species of shells were collected; these were all carefully drawn and named, then classified and arranged; and within a year about two hundred and ten species of shells were collected near Madras. On one excursion to Cuttawauk, eleven miles north of Madras, a most important discovery was made, which has since proved of much benefit to the School of Arts, and subsequently to many other parties. This was a bed of gypsum, or sulphate of lime, extending over several miles, in the vicinity of the canal, or backwater. This gypsum occurs in the purest form of selenite, or the glassy sulphate of lime. For the last twenty-four years it has been employed to make most of the plaster-moulds used in the School, and it proved of great use in some of the manufactures in silver, by enabling the native modellers to preserve working-casts of their designs in wax. A prize of twenty rupees had been offered to any person who could show where gypsum was to be found. Illustrations of the shells and fossils, as ammonites and belemnites, which occur among the greensand and gypsum formations of Europe, had been engraved on wood and inserted as a kind of illustrated advertisement in one of the newspapers of Madras. This notice, in three days, led to the discovery of a large bed of fibrous gypsum at Ootatoor, near Trichinopoly; and an East Indian apothecary, who had lately come to Madras, brought some very fine fibrous gypsum, with a great variety of beautiful fossils, for which he received the reward. He also reported that he had seen the same fossils and gypsum covering about thirteen miles of ground near Trichinopoly, and reappearing at seven or eight places between Ootatoor and Madras. Subsequent researches led to the verification of this report, and to the discovery of gypsum in eighteen or twenty localities in southern India. This one discovery led to several important and beneficial results, as the refinement, and multiplication, and cheapening of some of the

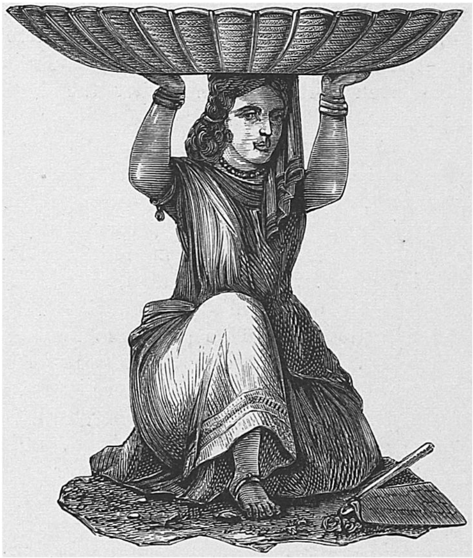

Fig. 8.

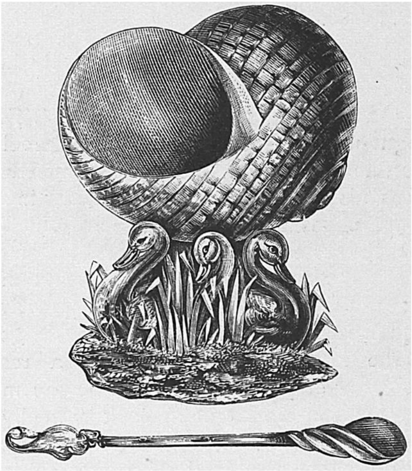

Fig. 9.

Art-industries of India, which we shall have occasion to refer to hereafter when describing some other Art-industries. The first result was that we were able to procure for two rupees, or four shillings, a cartload of selenite for making very strong plaster-moulds for models to be reproduced in silver, gold, bronze, brass, plaster, terra-cotta, and pottery. So abundant was the gypsum at Cuttawauk, near Ennore, that we used to procure from twenty to thirty tons of it every few months at the above cheap rate; since then the demand for it has increased so much in Madras, for making plaster-figures, moulds for silversmiths and brassfounders, and ornamental cornices for house decoration that the natives have taken to collecting and storing the gypsum, for which they now ask such a price that it is cheaper to get it by rail from Ootatoor, two hundred miles, than by cart only eleven miles. So much for the development of industry in Madras.

But to return to the subject of silver-manufactures. Having discovered a number of beautiful, and a few rare shells, and having drawn, engraved, classified, and arranged these, we next set to work to utilise them, by offering prizes for the best designs from these shells, applicable to the manufacture of silver saltcellars. The late Hon. W. A. Morehead, who was always interested in the success of the Madras School of Arts, offered a prize for the best designs. This prize was awarded to Mr. J. Duarte, a teacher in the school, who sent in two sheets of designs, from which we select the illustrations here engraved. These designs were afterwards etched upon copper, and distributed to other schools at the cost of two annas a sheet; and a few years afterwards we had the pleasure of seeing silver saltcellars produced from these designs in the School of Arts under his Highness the Maharajah of Travancore. Manufactures in silver were not then attempted in the Madras School of Arts. It may not be out of place to remark that from these two sheets, which cost the rajah four annas, or sixpence, his highness's silversmiths were enabled to earn about eight hundred rupees by saltcellars. We do not put these before the public as the best specimens of native workmanship, but to show that if our liberal-minded countrymen will try to encourage a little more the Art-industries of the East, the native princes and the native manufacturers will not be slow to take an interest in Art. There is one point of great importance that we must bear in mind. It is often asked —should we attempt in any way to engraft European improvements upon the Art-industries of the East; or should we leave their own, in which they have excelled nearly all other nations of Europe, undisturbed? The best answer to this is, that the manufacturers of India and the artists of the East do not yet know what the Fine Arts are, as they have not had opportunities of seeing any grand or fine works, beyond a few portraits in oil of our governors, commanders-in-chief, and celebrities, or a few marble busts and statues, with an occasional bronze statue of some very distinguished personage. The marble statues and the bronzes they thoroughly appreciate if they are lifelike, and the native workmen are quick to detect anything in our manufactures from which they can take hints; but the fault rests with us, that we do not give them these hints, while we take from them valuable suggestions and the patterns of their Art-industries; our manufacturers, who derive the substantial benefits at our exhibitions of Art-industry, do nothing for India in return. I am emboldened to speak out thus plainly as there are warm, kindly, and sympathetic hearts in Great Britain, who, though slow and difficult to move, may have the sparks of a Christian benevolence kindled into a lively and cheerful flame of brotherly love. I have not been afraid to tell some of my countrymen in Edinburgh, who are enjoying comfortable pensions or fortunes from India, China, or the East, that it is their duty to do something for India in return. To some few the appeal has brought conviction that it is just, and I hope hereafter to be able to chronicle liberal and beneficial results. In the meantime it may suffice to say that money is not the chief requisite in this matter, though money is forthcoming, and it may help to purchase what is wanted. Judgment, taste, and purity, must direct us in our choice of what is to be selected as worthy of imitation, if we are to give to India the Fine Arts as a civilising agency.

(*To be continued.*)

THE COOPER'S FAMILY.

E. Frère, Painter. G. C. Finden, Engraver.

THERE is no painter of the French school whose works are more generally popular in England, where they are almost as well known as in France, than those of M. Edouard Frère. Though brought up in the studio of Paul Delaroche, he carried out from it not, as it might naturally be assumed he would do, a feeling for high historic Art, but one decidedly inclined towards *genre* painting, choosing for his subjects, chiefly, those that represent the characteristics and incidents of domestic life among the more humble classes of society; and these he represents with the utmost tenderness and expressive sensibility. It is these qualities which win for him such good opinions; pictures of the kind always meet with a ready welcome. M. Frère's *manner* of painting may not be the most attractive to English eyes; his works often look "woolly"—to use a technicality—and his colouring is generally quiet and subdued; but their naturalness, combined with the spirit and feeling thrown into the compositions, gives to them an irresistible charm.

"Many French painters have tenderness," writes Mr. Hamerton, in his 'Contemporary French Painters,' "but not one of them has so much, I think, as Edouard Frère. He and his works are too well known in England to need much criticism here; indeed, of criticism I have little to offer, because their execution is always so modest, and their sentiment so true and pure, that criticism of such works looks like cruelty. No painter has ever better understood the poor country children in France; he never attempts to hide the effects of giving a well-fed and well-washed appearance to his humble heroines; they are what their hard fate has made them, yet we cannot wish them more robust or more prosperous. Since Edouard Frère has been much sought after by dealers, there is a perceptible decline in his finish, and I would rather have the pictures he painted a few years ago than those he paints now." This was written about six years since.

Here, in the workshop of a country cooper, his three children, seated on a barrow, are taking their morning meal, which, judging by the varied sizes of the bowls or basins in which the breakfast has been served to them, appears to be not according to their appetites but to their ages: but it is quite clear that the boy, who seems to be the youngest of the party, has not had a "Benjamin's mess" dealt out to him. The little fellow has probably taken a run before breakfast, which has given him an appetite, so his basin is soon cleared out, and he looks wistfully at his eldest sister as if, like Oliver Twist, he would ask for more; or rather, in the hope perhaps that her share should turn out to be beyond her requirements, and then the overplus might be made over to him. It is this boy who gives especial character to the composition; he makes it tell a story beyond that of the children simply taking their meal.

There are abundant indications of the father's trade in the furniture of the workshop, which appears to be lighted only through the doorway: the artist has so managed this as to give the picture a Rembrandtish effect. The work is not highly finished; indeed, it almost looks as if left incomplete; yet this in no degree affects the interest of the composition. It is one of a small but charming collection formed by Mr. Daniel Roberts; which also contains other excellent foreign pictures.